The mechanics of drawing: helping planners use serious games for participatory planning

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Participatory planning is a way planners can gather valuable information and improve the planning process. To engage citizens in participatory approaches, planners should explore new interactive methods. Combining drawing as a communication activity, and games as an engaging approach can be one of the participatory methods. We propose to explore games that planners can use as tools for this purpose. We searched for analogue games with core drawing mechanics, where planners could learn how to build their serious games. *Board Game Geek* (BGG) allowed us to explore the most successful modern board games that use drawing mechanics, focusing on examples of how they engaged players. We discussed these, proposing the Modding Drawing Games for Planning Process (MDGPP) framework, and arguing how these core and auxiliary game mechanics could help planners to make game-based planning approaches. With this contribution, we hope to provide a process to help professional planners deliver engaging experiences to collect data for participatory planning approaches.

Keywords: Board Games, Drawing, Participatory Planning, Serious Games

Introduction

Planners need new tools to respond to the increasing demand for participatory and collaborative planning processes. There is a need to have interactive tools to foster participation in planning and capable of generating useful data. Planners need to develop and experiment with new tools of and for engagement (Ampatzidou et al., 2018; Fainstein & DeFilippis, 2015; Wilson & Tewdwr-Jones, 2020). Games can be a solution because they can be very diverse and engaging (Tan, 2017). Serious game approaches provide some supported frameworks for practical applications (Mayer et al., 2014). Through serious games is possible to engage stakeholders with different backgrounds and perspectives, allowing them to share their perspectives in meaningful ways to support negotiation and collective decision-making. This playable participation happens in meaningful and pleasant ways that support collective learning, negotiation, and decision-making

Nevertheless, these are not unquestionable guidelines planning professionals can apply to implement serious games. Using interactive tools like games is not an easy endeavour for planners. Planners might not have the necessary game design skills and be far from mastering the appropriate facilitation techniques (Crookall, 2010). Planners need to also overcome some prejudices about game usage for serious purposes. Showing results from game-based planning processes help dismount these prejudices (Koens et al., 2020). In a recent experience, the local planning authorities of Marinha Grande (Portugal) were surprised by the easiness to engage participants and the outcomes of one fast serious planning game that approached the local transport system (Sousa et al., 2022).

Planners require a guiding process to begin dealing with game-based approaches. Learning from modern board game design can be a solution to help planners start exploring the game-based approaches for participatory planning practices (Sousa, 2020a, 2021b). These analog games are easier to adapt and modify to serious game approaches (Sousa, 2021b; Zagal et al., 2006). But the variety and quantity of modern board games are overwhelming. How can planners find game elements and design solutions to support their game approaches? Can focusing on a specific type of game or game mechanism be a solution?

We propose to use drawing games as core game mechanisms to help planners build their serious games for participatory and collaborative planning. Departing from these design principles (mechanisms to experiences/outcomes), we will focus on drawing games as core game mechanisms to help planners build their serious games for participatory and collaborative planning. Once the game mechanisms are the building blocks of game design (Engelstein & Shalev, 2019), focusing on one specific game mechanic could be a valid starting point to develop serious game approaches. Our work proposes to explore existing commercial ludic board games created for entertainment purposes. We focused on drawing, and how these games can help participants express ideas during the planning processes. We identify the characteristics of drawing games, looking at the most popular modern board game database platform (BGG). This search will allow to explore how the selected games, and their drawing mechanisms, can be transferred to participatory planning practices. We argue that professional planners can modify games to support participatory planning. By modifying core game mechanisms like drawing, planners can avoid some of the challenges of building new games. This way, planners can access and develop new instruments to refresh participatory planning methods, which help continuously engage stakeholders in an evolving and highly uncertain context.

Section 2 of this paper frames the participatory and collaborative planning approaches and relates them to serious game approaches, while section 3 introduces the benefits of drawing

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for participatory planning. Section 4 explains the methodology, data gathering and presents the results. Section 5 discusses the findings related to drawing games, also going beyond their core mechanics. Section 6 proposes a simple explanatory framework about the main findings, introducing the Modding Drawing Games for Planning Process (MDGPP) framework. Conclusion, gaps, and future research appear in the last section.

From participatory and collaborative planning to serious games

Citizens are willing to participate in the collective decision-making processes, mainly in processes that concern their daily lives and where local collaboration is achievable (Healey, 1997; Innes & Booher, 2018). Increasing the participation levels can help improve planning process and the ability address problems and formulate alternative solutions (Cilliers & Timmermans, 2014; Smith, 1973). But participatory planning is lacking processes and tools for citizens to express and affect decision-making (Legacy, 2017). Planning processes tend to be complex and difficult for citizens to grasp (Baker et al., 2007). Additionally, planners need new tools to help visualize and interpret the complexity of contemporary spatial systems (Rauws & De Roo, 2016). The unpredictability and emergent nature of game systems can be a way to overcome these problems, gather data and allow citizens to express their ideas and learn during interactive processes that are not scripted (Dodig & Groat, 2019a; Mayer, 2009). Game designers must let players decide their moves and actions, which can be unpredictable, especially in multiplayer interactions. Game designers define the game mechanisms and rules to balance these emergent behaviours and interactions, delivering experiences and outcomes according to predefined ranges of results. Despite these opportunities, the unpredictability of games (Costikyan, 2013) can make decision-makers and planners suspicious about game usage for planning (Tan, 2016). Player agency in an interactive game system with multiple feedback loops (Fullerton, 2014) generate unpredictable outcomes. Allowing players to change the game state (e.g., information in a map) during continuous multiplayer dynamics generates unpredictable results. However, games can deliver and frame different levels of controlled environments (Salen & Zimmerman, 2004). The unpredictability of games resulting from players' agency in multiplayer game sessions can foster creativity and new ways of expressing ideas. (Sousa, 2021b, 2020b), while the game designers have the power to combine mechanisms to control the game outcomes. Adding human expert mediation can increase the control and conduct the game dynamics for specific purposes (Brömmelstroet & Schrijnen, 2010). Defining game goals according to the purposes of each planning process is an obvious strategy to follow serious games principles. It also helps to evaluate a particular serious game approach.

Games are emergent systems that foster player agency (Salen & Zimmerman, 2004). This agency is a relevant trait of games to bring to participatory planning practices. Planners can design the game process and act as facilitators (Forester, 1999). In analogue games, the potential for fostering collaboration and players' agency is even higher. This effect results from the lack of automatization in analogue game systems (Zagal et al., 2006). The physical dimension of the components also helps participants and planners to nudge and bounding.

Exploring modern board game designs should allow us to benefit from their design innovations that engage new players every year (Sousa & Bernardo, 2019). Keeping up-to-date is hard, but planning with gamers in local gatherings, conventions and visiting BGG helps. Although these modern board games are becoming popular as entertaining games and a leisure pastime, using them for developing planning practice activities should be done carefully. Planners should analyse which game elements (e.g., mechanisms) are useful and which are not. Champlin et al. (2021) recommend delivering game-based planning activities that provide mediated structured dialogue between planning professionals and experiential knowledge of

citizens in multiple ways. These requirements relay in following co-design approaches, which allow participants to critique and influence the ongoing planning processes. Co-design principles are a way to test the most adequate game elements for each planning process.

From the many game-based approaches and strategies to transform games into tools to achieve predefined goals, serious games have been a growing trend in planning (Dodig & Groat, 2019b; Tan, 2017; Vanolo, 2018). But few of these approaches profit from modern board game designs (Schouten et al., 2017). Planners can adapt these modern board games or use their distinctive game mechanics for their own games (Sousa, 2020a, 2021b). As Constantinescu et al. (2020) stated, the game mechanics can determine the effectiveness of serious games. Game mechanics can be defined as core elements of any game system (Adams, 2014). Core mechanisms are the primary way players activate the game system, generating interactivity and building emergent experiences that can be unpredictable (Costikyan, 2013), although framed according to the design options taken during the game development. Game mechanics are the building blocks of games (Engelstein & Shalev, 2019; Zubek, 2020). They are the blocks that planners need to combine to develop their games. For this work, we will use game mechanics and game mechanisms as synonymous. In the game design literature, it is common to use the two terms as synonymous. But in the analogue game industry and gamer community, mechanisms are the current standard term due to the concept of the building blocks of game design (Engelstein & Shalev, 2019; Sousa, Oliveira, & Zagalo, 2021).

In order to achieve a serious game, as those games developed to engage participants in pleasant and meaningful activities while delivering predefined goals (Dörner et al., 2016; Michael & Chen, 2005), defining correct game mechanics is of the most importance. Games have mechanical systems that define what payers can do and how the outcomes may emerge. Serious game frameworks like the Design, Play, Experience (DPE) (Winn, 2009), which depart from the Mechanics, Dynamics, Aesthetics (MDA) (Hunicke et al., 2004) framework, are based on the cascading effects of mechanics to deliver experiences. Despite its applicability, the DPE framework was adapted by Sousa (2020a; 2022) to incorporate the facilitator role, which is essential to teach, support and do the debriefing process with analogue serious games (Sato & de Haan, 2016; Sousa & Dias, 2020). The previous frameworks highlight the importance of the mechanics in serious games. They reinforce the mechanics/mechanisms as building blocks planning professionals must manage when modding or building their serious games.

From the many available analogue game mechanics, we will focus on the drawing mechanics. We will follow this approach because it is something planners are more familiar with. Drawing is a natural way to express and communicate. Plans have graphical elements, and they usually are the most tangible elements of a planning process. Arguably, graphic representations have a higher potential to establish relationships between planners and citizens in a given planning process. The tangibility and easiness to adapt an analogue game (Zagal et al., 2006) promises to deliver ways to foster flexible co-creation processes that fuel communication between planning professionals and stakeholders (Champlin et al., 2021). As Wilson & Tewdwr-Jones (2020) found, allowing citizens to draw and talk makes participation in planning more effective. These authors also found that other ways of interaction and expression are valuable for future participatory planning approaches. We argue that games can be these interactive complementary processes.

Let's draw

Drawing is a human enact ability. While children draw naturally without being afraid of

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judgement, some adults say they are proud not to draw at all (Whiteford, 2009). It seems that above a certain age, individuals lose the habit to express themselves through drawings. Adults tend not to consider drawing as a serious way to communicate (Anning, 1999). Adults tend to misdraw objects due to bias and accumulated experience about the shapes and forms (Matthews & Adams, 2008).

Drawing can communicate spatial ideas, essential in a planning process. Drawing mind maps and schemes can be powerful communication techniques and efficient ways to express complex ideas (Eppler, 2006). Even annotations and free sketching can improve communication and facilitate gathering useful data for process improvement (Eppler & Pfister, 2010; Tanaka et al., 2009). Drawing can support discussions and verbal expressions, ideas, and foster collaboration (Tang, 1991). Allowing participants to draw and sketch helps them to focus and express their ideas (Bly, 1988). Participants that might not be comfortable doing public speaking can express their insights through drawing. So, during a participatory planning process, allowing citizens to draw can be immensely important to make their ideas more tangible and meaningful for other participants and planning professionals.

Usually, planners try to engage participants by showing images of their planning proposals, but this passive communication can be ineffective. The 3D representations and simulations can be too complex for citizens to grasp (Salter et al., 2009). We can overcome some of these challenges by using simpler graphic representations and allow participants to represent themselves and their understanding of issues at stake by drawing. Drawing workshops can help participants to express ideas and learn from planning professionals (Goodspeed, 2016). Modern board games can deliver the mechanics to profit from the advantages of drawings and the engagement games provide. We consider engagement as the ability for citizens and stakeholders to invest time into a process, doing pleasant and meaningful activities that fits their preferences (Zagalo, 2020).

Before entering complex drawing activities, adults need to practice before in order not to disengage (Knight et al., 2016). Small "ice-breaking" games can be a way to train drawing expression and gradually immerse participants in the planning process. Adults might have some prejudices about game usage for planning (Ampatzidou et al., 2018). These introductory approaches might deliver a solution while showing elected decision-makers and planners that playful activities can deliver workable results (Nijholt, 2020).

Identifying games to learn drawing game mechanisms

The quantity of existing analogue games is overwhelming. It is necessary to find a game database to start from and gradually understand the state of the art of analogue game design. In order to find and identify drawing mechanisms, we consider *Board Game Geek* (BGG) (www.boardgamegeek.com) database because it is the primary source of information about modern board games, with more than 125.000 games registered and 3 million users from all over the world that fuel the website daily (Rogerson & Gibbs, 2018; Sousa & Bernardo, 2019). At BGG, we can find a list of game mechanics (or mechanisms).

Method for selecting games

In the browse section of the BGG website top bar, there are several grouping classifications. It is possible to directly choose the "Mechanisms" or the "Families" game typologies. We can find the "paper and pencil" and "line drawing" mechanisms which revealed games where players write and do schemes but do not draw any type of ideas. This unappropriated result leads us to find in the available game families a better match. The "drawing: mechanisms"

revealed games where more free drawing was the core activity player do.

After obtaining a list of games that use this drawing mechanism, BGG allows organizing the list by rank, showing the games the BGG users play the most and provide the best experiences according. This process was tested previously for other serious game processes by Sousa et al. (2021).

Although BGG provides extensive data and classification about the games, the abstraction of some game mechanisms could difficult a direct analysis. To select games where players draw ideas that can lead to complex representations each game must be analyzed carefully. The rules of play of every game were analyzed in detail to understand the gameplay, components, mechanisms, and other relevant traits. BGG provides links and files with the rules of the games and many explanatory videos. The criteria to consider the games resulted from the crossing of the highest rank, which proves the game is engaging, and the game mechanisms that allow drawing expression. The author selected the top 10 rank BGG games with these features, reading the rules and directly testing each game. Ten games provided a sample of different game systems.

Exploring the games and the respective players' feedback at BGG confirmed that the games deliver the expected experiences: the ability to let players express and communicate ideas through multiplayer interaction and drawing.

Figure 1 expresses the process of selecting the game to analyze based on their core mechanisms and the appreciation rank. This process allows to identify the games by different core mechanisms and other features are necessary (e.g., complexity, duration, number of players) that deliver serious game objectives (e.g., allowing participants to express ideas).
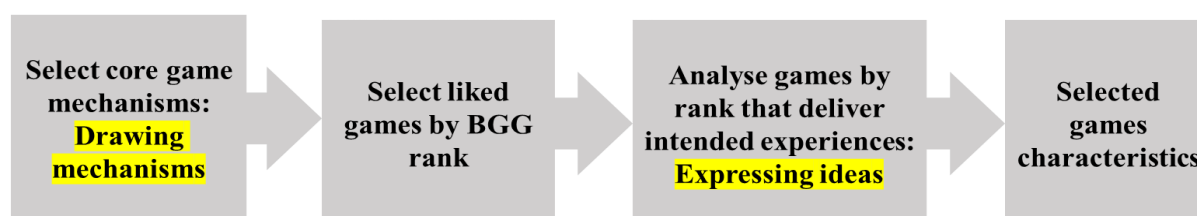

Figure 1. Searching for game on BGG with specific core mechanisms that deliver predefined dynamics to find their characteristics.

The results

Table 1 shows the top 10 games from BGG that allow free drawing expression. We did not consider games that were just about pointing to answers, highlighting objects, or drawing paths. Many of these games were related to the "paper and pencil" mechanism. We were looking for examples of games with game drawing mechanisms that lead players to express ideas by drawings with as much freedom as possible. This ability is valuable for planning professionals because they can use these game mechanisms to provide citizens and stakeholders with different ways of expressing themselves.

Table 1. Characteristics of the Top 10 BGG games with "drawing: mechanism" that allow free drawing.

Game	BGG rank	Duration (minutes)	Player count	Platform to draw	Challenge

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			(Players)		
Telestrations (Användbart Litet Företag, 2009)	265	30	4 - 8	Individual notebooks	Interpret words and drawings to maintain the idea.
Fake Artist Goes to New York (Sasaki, 2012)	660	20	5 - 10	One collective draw space	Add drawing elements and combine with storytelling to find the player that does not know the idea.
Pictomania (Chvátil, 2011)	746	25	3 - 6	Individual draw spaces	At the same time, drawing and bet to guess other players drawings.
Duplik (Jacobson & Kohout, 2005)	1452	45	3 - 10	Individual draw spaces	Players draw described ideas and are evaluated by achieving predetermined criteria.
Pictionary (Angel, 1985)	4700	90	3 - 16	One draw space	Teams try to guess words based on drawings made by teammates.
Artbox (Lis, 2019)	6014	25-45	3 - 8	Individual draw spaces	Players draw pictures by using limited shapes and then try to guess each player drawings.
Subtext (Warsch, 2019)	6088	20-40	4 - 8	One draw space	A player deal cards to another player, but only one know the word also. All players will try to guess the objective. Only one player will successfully guess.
Luck of the Draw (Scott, 2006)	8334	30	4 - 8	Individual draw spaces	Each player tries to represent a painting masterpiece in 45 seconds, and then all players vote to determine the best drawing.
What's Missing? (Sirieix, 2020)	10215	20	3 - 6	Individual draw spaces	Draw above transparent paper to complement a given drawing. Other players must guess what is missing.

Table 1 reveals some common traits of the selected drawing games, which help to understand the game dynamics. The most enjoyable drawing games tend to be party games (Sousa & Bernardo, 2019). These party games allow higher player counts, on average from 4 to 8 players. But some like *Pictionary*, *Fake Artist Goes to New York*, and an alternative version of *Telestrations* for 12 players allow more persons to participate in the game simultaneously. The sample reveals low-complexity games according to BGG classification. Any person can play these games without demanding high game experiences. Only *Pictionary* requires more than 45 five minutes to be played. *Pictionary* is the oldest game of the sample (1985). All the other games were released after 2005. Since this sample gathers top-ranked games, it is relevant to state that there are two games from 2019 and one from 2020, which means that new games are engaging players. This BGG ranking system provides a selection of games that thousands of players enjoy (were engaged by the games). Considering these game characteristics are valid indicators of enjoyment that can guide the development of other serious games.

Our sample shows games to play in less than 30 minutes, like *Telestrations*, *Fake Artist Goes*

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to New York, *Pictomania*, *Luck of the Draw* and *What´s Missing?*. Three games rely on a simple draw space, and only one of this transform this space into a collaborative activity (*Fake Artist Goes to New York*). All other games provide players with individual drawing spaces. Although we must highlight that *Telestration* provides each player with a notebook since the game generates sequences of words and draws to generate a logic chain. Most of the games rely on "guessing" as a challenge. The "guessing" is more a dynamic than a mechanism according to the MDA framework. These "guessing" games demand players to draw for others to understand ideas (this is the classic example of *Pictionary*). But more modern games like *Pictomania* and *Fake Artist Goes to New York* add other layers of complexity and excitement. Players do several simultaneous tasks, like in *Pictomania*, drawing while trying to guess other players drawings. *Fake Artist Goes to New York* establish a collaborative activity that fosters trust and distrust, relying on drawing exercises and storytelling. *Telestrations* build sequences of convergence and divergence ideas that fuel imagination (Sousa, 2021b). Besides the guessing, many games of the sample, directly or indirectly, establish democratic processes to do the decision-making process or demand to choose the best performance. Only *Pictomania* is not a turn-based game. All the other games determine turns for the players to activate the game mechanisms. In theory, all players have the same opportunity to participate and influence the game state in a turn-based game (Engelstein & Shalev, 2019).

Going beyond the ten selected games, we highlight other cases. *Railroad Ink: Deep Blue Edition* (Hach & Silva, 2018) is a game where players express how they would create a transport network made of railways, roadways, and waterways (Figure 1). In this game, all players have the same resources, determined by dice rolls. But at the end of the game, every player board will be different. Players draw in their player board the dice images that represent transportation infrastructure. Players do the drawings following schematic representations of each type of infrastructure in a squared grid. This layout and options help players use meaningful graphic expressions and adopt the same scale. Games like *Railroad Ink: Blue Edition* are not traditional party games. They are more like eurogames (Woods, 2012). Players are competing, avoiding direct confrontation, by choosing the best option to score the most points.

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Figure 2. Example of the result from playing Railroad Ink: Deep Blue edition.
Source: authors

Another example of strategic drawing games is the "crayon series". *Empire Builder* (Bromley & Fawcett, 1982) is one of these games where players draw their networks over the board game maps, aiming to be efficient. *Roads and Boats* (Doumen & Wiersinga, 1999) is another game where players draw transport connections in a transparent paper over a territory. These are games more about efficiency, although they demand creativity to find solutions. Therefore, our selection of ten games based on the "drawing: mechanism" seems valid to foster creativity and expression on complex ideas.

Going beyond core mechanisms

Drawing mechanisms appear in several successful modern board games, those that many thousands of persons enjoy playing. Drawing is associated with party games, a type of game known to be simple and engage large groups of players simultaneously (Woods, 2012). Playing these party games deliver different forms of collaboration among players, by playing in teams, playing collaborative or just by the social contract that emerges from playing an analogue game (Duarte et al., 2015) But the transposition of these game mechanisms to participatory planning activities might not be evident. Planners need to have game literacy or to work with someone with this knowledge. Even simple and fast games like those presented in Table 1 can be challenging for inexperienced players (Sousa & Dias, 2020). Starting with simpler games that can be learned and played fast can be a successful strategy. The goal can be profiting from the engagement and creativity these games can bring to planning practices.

These games could inspire ways to address bias and discuss important issues that emerge

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through the drawing expression. The drawing mechanisms help participants to express their ideas graphically, fostering creativity. It introduces challenges to the player (participant) that is drawing and to the other players (participants) that are interpreting the shared ideas. The available options the game system provide can help to frame problems and solutions in a language all can use and relate with. Games can define what shapes to use, how many lines to draw, predefine a grid to fill, define forbidden or mandatory words to represent and many other combinations of restrains or supporting tools. Drawings are compatible with storytelling as an expression of the author or as the interpretation from other participants in the game. Citizens and stakeholders can discuss in a positive, safe, and humorous environment, mediated by professional planners that can explore these drawing games. Table 2 expresses the features associated with the games that explore drawings as core game mechanisms.

Table 2. Features of drawing games planners can replicate in planning.

Game	Foster			
	Expression though free drawing	Framework to draw uniformly	storytelling	Participants, interpretation
Telestrations	●			●
Fake Artist Goes to New York	●		●	●
Pictomania	●			●
Duplik	●	●	●	●
Pictionary	●			●
Artbox		●		●
Subtext	●			●
Luck of the Draw	●			
What's Missing?		●		●

The explored games allow players to express ideas, but the games we presented here rely on predefined concepts and words to be represented through gameplay. Guessing and having the most votes for a successful representation is the way players are engaged. In some cases, like in *Telestrations*, players may ignore the voting/scoring system and enjoy the funny interpretations and misleads. It becomes a humour exercise. This humorous mood may happen in most of these games. This kind of enjoyment is one of the reasons these games are classified as party games. When played in a planning process, these games can generate different data. Planners can use the drawings, the discussions, and the debriefing outcomes. At this stage, the challenge is how to organize this data. These methodologic limitations complicate, even more, the overall difficulty of transforming participation into fruitful enjoyment.

The survey revealed 10 games with high potential but many others that seemed also relevant to inspire game-based planning processes should not be neglected. Maybe the focus on one core mechanism is just the starting point of the approach. Considering other mechanisms might bring new ways to build adapt and develop serious games for planning practice.

One way to profit from the drawing party games to support game-based planning dynamics is to modify them. Planning practitioners can do simple modifications to support citizens to express their ideas (Sousa, 2020b). But games tend to have more than one mechanism. We considered the drawing as the core game mechanism, but others are necessary to support the game dynamic, usually called auxiliary mechanisms (Sousa, Oliveira, & Zagalo, 2021). Drawing mechanisms allow expression, while other game mechanisms can help mediate the participation. The turn-based game mechanisms allow equality of participation. The game

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mechanisms can frame how players should do the drawings. This guidance can restrain freedom but can level player skills and allow all participants to draw their ideas. Limiting the available forms and time to make drawings can create tension and reduce the game duration. These limitations are some of the challenges that can engage more participants.

To benefit from the game usage for planning processes, we propose to follow the modding approaches (Castronova & Knowles, 2015; Sousa, 2021b, 2020c). Planners may replace the cards, dices, or other randomizing systems to predetermine the issues and subjects at stake. By doing this, planners can frame the process and conduct the participants to work and express ideas related to specific planning issues. For example, planners can define game-based planning processes to address urban sustainability problems (Sousa, 2020a). The guessing and voting systems led participants to analysed other players expressions. Acknowledging other participants claims is essential to enter a decision-making process that fits the collaborative planning approaches and collective decision making (Innes & Booher, 2018).
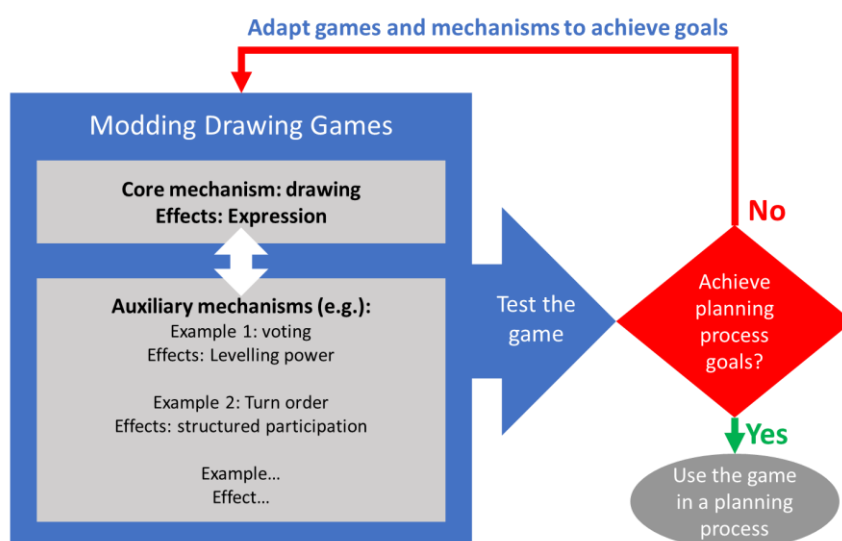

Figure 3. Modding drawing games for planning processes (MDGPP)
Source: author

Figure 3 proposes a simplified framework for modifying existing games that have drawing as the core mechanism as well as several auxiliary mechanisms. The proposed framework establishes the relationships between game mechanisms and effects applicable for participatory planning processes. Planning professionals can follow these recommendations, adapting and playtesting the games before using them in a planning process. This proposal is an interactive proceeding that simplified the Mechanics for Engagement Design Protocol (MDEP) (Sousa et al., 2021). Our Modding Drawing Games for Planning Processes (MDGPP) framework reduced several steps of the MDEP, focusing on the effects of using specific mechanisms and the testing before using the games in practice. Even though the modding approach reduces the need for planners to master game design, aiming only on one core mechanism might not be enough. Using serious games might demand higher game design knowledge than initially expected.

Serious games also demand the game to help players achieve goals. In the case of participatory planning, the game must be engaging, support communication and data collection. Table 2 highlights four main features planners can use to develop games or simple dynamics to foster active creativity and interactions. The games that allow free drawing

expression foster creativity and express ideas that might be difficult to emerge othewise. Giving the participants time to do their drawings alone explore their individual participation. Constraining the things and how they can draw and where to draw helps uniform the language. Storytelling can be a complementary activity to enrich the drawings meanings, which can be done by the author of the draw or by the other players interpreting it. The last feature refers to the ability of players to interpret what other participants have done or added. The interpretation incentivizes players to understand other participants ideas, claims or concerns. This simple shift fosters active participation and considering others.

The selection of the 10 top BGG games with drawing mechanics assures that engagement is achievable. By playing the game, participants should have a better experience than in traditional planning processes. The game should provide planners with relevant and unique data. These are the goals considered in the Figure 2 decision box. Failing to achieve these goals lead to new game modifications and testing.

Conclusions

Game design is hard to master but using existing analogue games can be a solution for planners to enter game-based planning. We dove into the modern board game design to find how drawing games could help planners use game-based approaches for participatory planning processes.   Drawing mechanisms can be simple to use and fuel serious game dynamics that are engaging and support planners' activities.

Although using games demand specific knowledge, we proposed a method to benefit from simple game approaches, following a simplification of the MDEP protocol. Arguably, profiting from existing game mechanisms and successful game implementations are easier approaches than developing a new game. This proposal establishes a first approach that planners can undertake to explore modern board games. But continuous testing and experimentation are recommended as planners dive into analogue serious game usage. Analyzing how other core mechanisms support a specific planning process seems a promising path. Despite being less complex, the modding approach demands planners to deal with some game design issues.   The MDEP demanded searching for game mechanisms to develop new games, while the Modding drawing games for planning processes (MDGPP) supports modding existing games.

Knowing how to search for game mechanisms can help planners do their serious games. Core drawing mechanisms appear in many different games. These mechanisms are not rigid. They are implemented according to the way they are combined with other auxiliary mechanisms. We realized that focusing only on one core mechanism might be very constraining because a game has many mechanisms. Even the simpler ones have two or three auxiliary game mechanisms to build the playing experience. The concept of core mechanisms and auxiliary mechanisms help define what modifications to do and what effects to expect. Planners can adapt analogue games to their planning process, but playtesting is necessary due to the unpredictability of combining different mechanisms and how participants will react to them.

Despite the process of searching games by the "drawing: mechanism" and selecting a sample of the highest raked ones revealed a meaningful list of games to discuss, many other games were missing. BGG also define "paper and pencil" and "line drawing" mechanisms. There are several overlays in our sample, games that share these mechanisms. "Paper and pencil" and "line drawing" can be considered more abstract ways of doing graphical representation related to the drawing games.

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Nevertheless, modding games is less expensive and time-consuming than developing new analogue games and digital games. Or, when aiming to create a digital game, analogue prototyping is a proven way to deliver the first steps for digital game development (Brathwaite & Schreiber, 2009). Despite analogue game potentials, these games have their own restrictions to achieve detailed simulation while demanding high facilitation (Sousa, 2020a). But mastering the analogue game mechanisms also allows planners to transfer the same dynamics to online game-based activities (Sousa, 2021a).

Drawing games are among the lowest complexity modern board games to play. Their party game nature allows fast engagement and low barriers of complexity to enter a ludic experience. Planners can use these game mechanisms to provide participants with multiple experiences: creative expression, debates, empathy, negotiation, and decision-making. Games can deliver these experiences, depending on how their mechanisms are combined and activated. We believe these games can provide valuable "ice-breaking" exercises for a planning process or to establish specific serious games that aim to be a planning process by themselves. These approaches are being used successfully during the development of *Urbsecurity* (www.urbact.eu/urbsecurity), an *Urbact* project. The literature on serious games for planning also shows that this is viable to some extent (Ampatzidou et al., 2018; Dodig & Groat, 2019b; Tan, 2017; Vanolo, 2018). Despite the notion that serious games have a high potential for planning applications, the specific traits of modern board games are far from being explored.

The analytical dimension of serious games is imperative to consider. Finding ways to analyze the data from the drawings, the discussions and debriefing processes is relevant. We recommended future research to deal with these challenges.

Games offer infinite possibilities for planners to use in their practices. Modern board games innovations are no exception and can allow planners to go beyond traditional game usage. The analogue dimension of these games provides tangibility and flexibility to adapt their mechanisms to participatory planning approaches. The drawing mechanisms seem to be one of the mechanisms with a higher potential for fostering creativity. Drawing allows participants to express themselves in multiple ways, generating tangible outputs, and comprehensive frameworks that help other participants interpretations (Table 2).

By modding games where drawing is a core mechanism, professional planners also need to deal with the effects of auxiliary mechanisms, gradually entering the game design. Using games demand specific knowledge of game development, like considering the users' experience. Besides this game design general challenges, developing serious goals obliges creating games that achieve specific goals beyond fun and entertainment. Departing from existing games can simplify these processes.

We believe the Modding Drawing Games for Planning Process (MDGPP) framework help planners find games and game mechanisms to develop their own serious game approaches. Drawing games and their specific core game mechanisms are among the most simple and flexible ones to use. Mastering these designs can lead planners to complex game approaches, especially when adding other auxiliary game mechanisms.

Funding

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